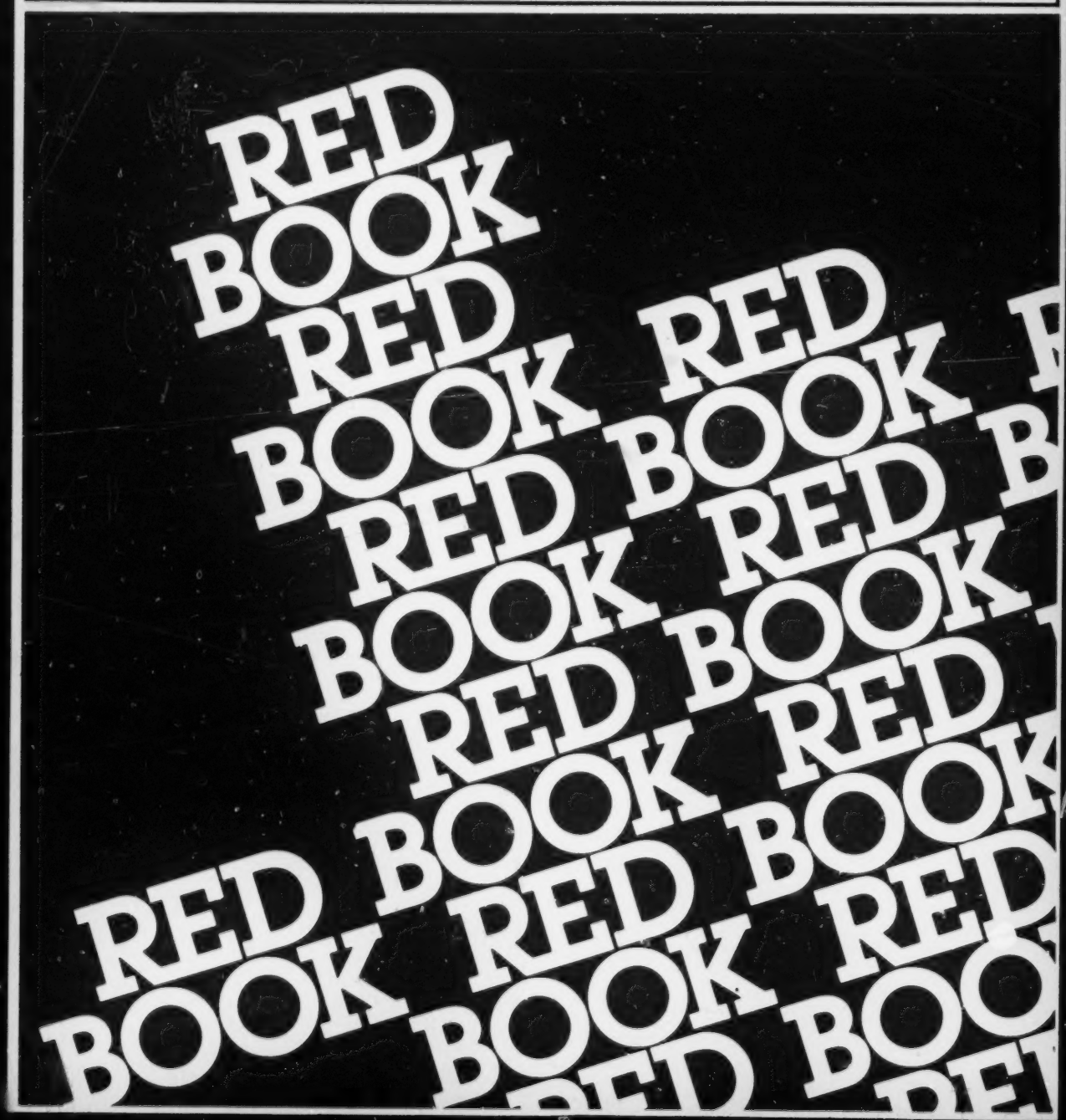
Implement & Tractor

The business magazine of the farm and industrial equipment industry

March 31, 1987



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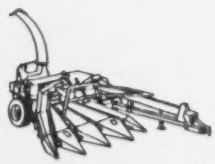

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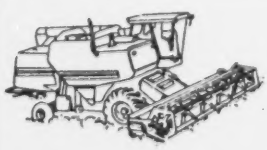

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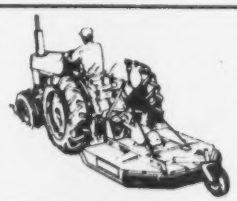

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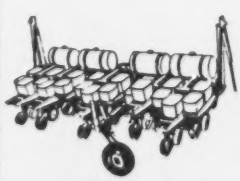

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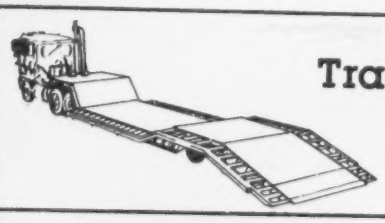

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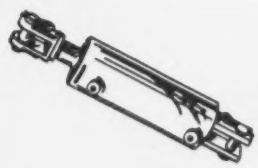

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Abbreviations:
DNA – Does not apply.
NA – Not available.
Std. – Standard.
Opt. – Optional
Linear measurements may be to nearest ¼-inch.

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The Nebraska Tractor Test Law

Purpose of the Law — The Nebraska Tractor Test Law originated in 1919 for the purpose of verifying advertising claims on tractors offered for sale to Nebraska farmers.

Its position as the only independent test laboratory in the United States devoted to the evaluation of tractor performance proved of unique value to the industry. The Agricultural Tractor Test Code used in the Nebraska Tests was developed with the approval and assistance of the American Society of Agricultural Engineers and the Society of Automotive engineers, and is revised and updated periodically as the need arises. The Test Code (ASAE S209.4 or SAE J708c) is published in the ASAE Yearbook and SAE Handbook.

Provisions of the Law — Stated briefly, the Nebraska Tractor Test Law, as amended in 1986, provides:

That a stock unit of each agricultural tractor model sold in Nebraska shall be tested and passed upon by a board of three engineers under the supervision and direction of the University of Nebraska, or by the O.E.C.D. Each tractor must be certified as a stock model and will be equipped with the common power consuming accessories. An official representative of the manufacturer is present during the test to see that the performance meets company standards.

The Department of Agriculture shall deny to any manufacturer the right to do business in the State on complaint of two or more bona fide customers that the company has failed to maintain an adequate service station with a full supply of replacement parts within the State and within reasonable distance of customers.

The law further states that it shall be unlawful to publish excerpts from any official test in advertising material without publishing the entire report.

The provisions of the Nebraska Test Law do not apply to any tractor the engine of which develops less than 20 horsepower; or to tractors manufactured, sold and used for heavy construction when identical units are not sold and used for agricultural purposes.

Explanation of Test Reports

General

Tractors are tested at the University of Nebraska according to the Agricultural Tractor Test Code approved by the American Society of Agricultural Engineers and the Society of Automotive Engineers or official Nebraska test procedure.

The manufacturer selects the tractor to be tested and certifies that it is a stock model. Each tractor is equipped with the common power consuming accessories such as power steering, power lift pump, generator, etc., if available. Power consuming accessories may be disconnected only when the means for disconnecting can be reached from the operating station. An official representative of the company is present during the test to see that the tractor gives its optimum performance. Additional weight may be added to the tractor as ballast if the manufacturer recommends use of such ballast. The static tire loads and the tire inflation pressures must conform to the specifications of Tire and Rim Association.

Preparation for Test

The engine crankcase is drained and refilled with new oil conforming to specifications in the operator's manual. The operator's manual is also used as the guide for selecting the proper fuel and for routine lubrication and maintenance operations.

The tractor is limbered up for a minimum of three hours on the drawbar. Preliminary adjustment of the tractor is permitted at this time. Any parts added or replaced during the limber-up run, or any subsequent runs, are mentioned in the individual test reports. The tractor is equipped with approximately the amount of added ballast that is to be used during the drawbar runs.

PTO Performance

Power take-off performance runs are made by connecting the power take-off to a dynamometer. During a preliminary power take-off run the manufacturer's representative may make adjustment for the fuel, ignition or injection timing and governor control settings. These settings must be maintained for the remainder of the test. The manually operated governor control mechanism is set to provide the high-idle speed specified by the manufacturer. During the power take-off runs an ambient air temperature of approximately 75°F. (24.0°C) is maintained.

Maximum power is obtained at the rated engine speed specified by the manufacturer with the governor control lever set for maximum power. This same setting is used for all subsequent PTO runs. Time of the run is two hours. Whenever the power take-off speed during the maximum power run differs from the speeds set forth in the ASAE and SAE standards, an additional run is made at either 540 or 1000 rpm of the power take-off shaft. Time of this run is one hour.

Drawbar Performance

Maximum drawbar power is shown for the normal field speed selected by the manufacturer. All engine adjustments are the same as those used in the power take-off runs. If the manufacturer specifies a different rated engine speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified.

Maximum drawbar power is determined within the following limits: (1) slip of the drivers must not exceed 15% for pneumatic tires on the concrete test course or 7% for steel cleats on the well packed earthen test course, (2) ground speeds must not exceed 10 miles per hour, (3) safe stability limits of the tractor must not be exceeded, (4) no other operating limit of the tractor must be exceeded. Drawbar load is applied until the manufacturer's rated engine speed is obtained with maximum governor control lever setting. Travel speed, drawbar pull and other data are recorded over two 500-foot straight level areas.

Fuel consumption is determined at the manufacturer's selected travel speed with the drawbar pull set: (1) to give rated engine rpm, (2) 75% of the pull at rated engine rpm, (3) 50% of the pull at rated engine rpm, and (4) maintaining the same load and travel speed as in (3) by shifting to a higher gear and reducing the engine rpm.

This summary shows the drawbar horsepower, corresponding travel speed and fuel consumption at 100%, 75% or 50% loads, and 50% of pull at reduced engine speed.

Also shown is the maximum drawbar horsepower produced for two 500-foot travel sections and corresponding travel speed, the maximum drawbar pull and the corresponding drive-wheel slippage.

In addition, the "lugging ability" obtained by increasing the load so that the full throttle engine speed drops to 80% of rated is given as a percent increase with respect to the pull at rated engine rpm.

The maximum drawbar horsepower and the corresponding speed and drawbar pull for other selected gears or travel speeds are shown in the individual test reports.

Three-point Hitch Test

The hitch testing procedure is based primarily on standard procedures (ASAE 349.1 and SAE J283) adopted by ASAE and the Society of Automotive Engineers, plus ASAE and SAE standards for tractor 3-point hitch and quick coupler dimensions and operation. ISO (International Standards Organization) standard 7414-1982 (E), "Agricultural Equipment — Matching of Wheeled Tractors and Rear Mounted Implements — Code Numbering System," has also had a role in the test development.

According to the procedure adopted by the Board of Test Engineers July 29, 1983, "The Three Point Hydraulic Lift test will apply to all tractors brought for testing to the Nebraska Tractor Test Laboratory which have the three-point lift attachment as standard equipment or as an option." Those procedures also specify that distribution and total tractor weight will be in accordance with limits set by the tractor manufacturer, tire manufacturer and ROPS certification, and weight shall include full fuel tanks and a 175-lb. operator. Front end ballast can only be provided by a standard weight package and/or front tire ballast supplied or recommended by the manufacturer.

The tractor is tested on the same rear tires used during drawbar track tests, and front tires of 2WD or FWA tractors may be of any size or ply offered by the tractor manufacturer as long as they properly match rear tires. A quick attaching coupler is used on all Category III and IV hitches and on any other tractors on which it is offered as standard equipment. But, the quick coupler is *not* considered part of the load lifted by the hitch.

Measurements taken include engine temperature, crankshaft rpm, hydraulic oil pressure and temperature, vertical displacement of lower link implement attaching points, lift time, vertical movement of the applied load, plus any other variables necessary to describe system performance.

Sound Measurement

Sound is recorded during each of the Drawbar Performance runs as the tractor travels on a straight section of the test course. The dB(A) sound level is obtained with the microphone located near the right ear of the operator. Bystander sound readings are taken with the microphone placed 25 feet (7.5 m) from the line of travel of the tractor. An increase of 10dB(A) will approximately double the loudness to the human ear.

Individual copies of any test report, annual summary booklets or annual subscription (at $7.00 for U.S. & Canada, $10.00 for foreign) are available. For complete information write to **Nebraska Tractor Test Laboratory, Department of Agricultural Engineering, The University of Nebraska — Lincoln, Institute of Agriculture and Natural Resources, Lincoln, NE 68583-0832.**

NEBRASKA TRACTOR TEST 1589—JOHN DEERE 3150 DIESEL 16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed — Two hours (PTO Speed — 997 rpm)								
26.06 (71.63)	2400	5.841 (22.111)	0.426 (0.259)	16.45 (3.240)	183 (84.1)	64 (17.6)	75 (21.8)	28.90 (97.59)
VARYING POWER AND FUEL CONSUMPTION — Two Hours								
83.90 (62.56)	2466	5.257 (19.899)	0.439 (0.267)	15.96 (3.144)	182 (83.3)	64 (17.8)	75 (23.9)	....
0.00 (0.00)	2562	1.948 (7.373)	....	....	180 (82.2)	63 (17.2)	75 (23.9)	....
42.58 (31.75)	2501	3.467 (13.126)	0.571 (0.347)	12.28 (2.419)	181 (82.8)	64 (17.5)	76 (24.2)	....
96.53 (71.98)	2400	5.826 (22.055)	0.425 (0.257)	16.57 (3.264)	184 (84.4)	64 (17.5)	75 (23.9)	....
21.45 (15.98)	2520	2.723 (10.306)	0.890 (0.542)	7.87 (1.550)	180 (82.2)	63 (16.9)	76 (24.2)	....
63.39 (47.27)	2484	4.294 (16.253)	0.475 (0.289)	14.76 (2.908)	182 (83.3)	62 (16.7)	76 (24.2)	....
Av 51.30 Av (38.26)	2488	3.919 (14.833)	0.555 (0.326)	15.09 (2.979)	182 (83.1)	63 (17.3)	75 (24.0)	28.90 (97.58)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power — Two Hours 9th (5L) Gear											
81.92 (61.09)	5445 (24.22)	5.64 (9.08)	2599	5.08	5.758 (21.795)	0.493 (0.300)	14.25 (2.803)	185 (84.7)	47 (8.3)	60 (15.6)	29.18 (98.54)
75% of Pull at Maximum Power — Ten Hours 9th (5L) Gear											
65.18 (48.60)	4140 (18.42)	5.90 (9.50)	2475	5.63	4.887 (18.500)	0.525 (0.320)	13.34 (2.627)	184 (84.3)	46 (7.7)	58 (14.3)	29.15 (98.36)
50% of Pull at Maximum Power — Two Hours 9th (5L) Gear											
44.30 (33.03)	2760 (12.28)	6.02 (9.69)	2491	2.59	3.953 (14.962)	0.625 (0.380)	11.21 (2.208)	184 (84.4)	47 (8.3)	62 (16.7)	29.14 (98.40)
50% of Pull at Reduced Engine Speed — Two Hours 12th (6H) Gear											
44.30 (33.03)	2760 (12.28)	6.02 (9.69)	1469	2.63	3.025 (11.451)	0.479 (0.291)	14.64 (2.885)	182 (83.1)	49 (9.4)	62 (16.7)	28.96 (97.78)
MAXIMUM POWER IN SELECTED GEARS											
71.78 (53.53)	10507 (46.74)	2.56 (4.12)	2453	14.83	4th (2H) Gear			183 (83.6)	45 (6.9)	51 (10.6)	28.97 (97.83)
77.80 (58.02)	9565 (42.55)	3.05 (4.91)	2401	11.65	5th (5L) Gear			185 (83.9)	45 (7.2)	55 (12.8)	29.19 (98.57)
79.51 (59.14)	7645 (34.00)	3.89 (6.26)	2399	8.03	6th (5H) Gear			184 (84.2)	45 (7.2)	55 (12.8)	29.19 (98.57)
81.49 (60.77)	7062 (31.41)	4.33 (6.96)	2400	6.77	7th (4L) Gear			183 (83.9)	45 (7.2)	54 (12.2)	29.19 (98.57)
81.37 (60.68)	5647 (25.12)	5.40 (8.70)	2398	5.16	8th (4H) Gear			183 (83.9)	45 (7.2)	54 (12.2)	29.19 (98.57)
83.04 (61.92)	5520 (24.55)	5.64 (9.08)	2399	4.92	9th (5L) Gear			184 (84.2)	46 (7.8)	57 (13.9)	29.20 (98.60)
82.08 (61.21)	4595 (19.55)	7.00 (11.27)	2397	3.97	10th (5H) Gear			184 (84.2)	46 (7.8)	57 (13.9)	29.20 (98.60)
81.74 (60.96)	3863 (17.18)	7.94 (12.77)	2401	3.41	11th (6L) Gear			184 (84.2)	46 (7.8)	56 (13.3)	29.20 (98.60)
78.60 (58.62)	3004 (13.36)	9.81 (15.79)	2399	2.76	12th (6H) Gear			183 (83.9)	46 (7.8)	56 (13.3)	29.20 (98.60)

Department of Agricultural Engineering

Dates of Test: April 1 to 14, 1986

Manufacturer: JOHN DEERE TRACTOR WERKE MANNHEIM, Mannheim, West Germany

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.9 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8417 **Fuel weight** 7.008 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 2.813 gal *(10.647 l)* **Drained from motor** 2.391 gal *(9.050 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic oil **Total time engine was operated** 35.0 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical **Serial No.** °CD6359D6832229° **Crankshaft** lengthwise **Rated rpm** 2400 **Bore and stroke** 4.19" × 4.33" *(106.5 mm × 110 mm)* **Compression ratio** 17.8 to 1 **Displacement** 359 cu in *(5883 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: Type front wheel assist **Serial No.** °L03150U565096° **Tread width** rear 62.2" *(1580 mm)* to 94.9" *(2410 mm)* front 66.9" *(1700 mm)* to 82.7" *(2100 mm)* **Wheel base** 101.7" *(2582 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 36.1" *(917 mm)* Vertical distance above roadway 38.6" *(980 mm)* Horizontal distance from center of rear wheel tread 0.2" *(5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 1.7 *(2.7)* second 2.1 *(3.3)* third 2.3 *(3.8)* fourth 2.9 *(4.6)* fifth 3.4 *(5.4)* sixth 4.1 *(6.6)* seventh 4.5 *(7.3)* eighth 5.5 *(8.9)* ninth 5.8 *(9.3)* tenth 7.1 *(11.4)* eleventh 8.0 *(12.9)* twelfth 9.8 *(15.8)* thirteenth 11.5 *(18.5)* fourteenth 14.1 *(22.7)* fifteenth 15.5 *(24.9)* sixteenth 19.0 *(30.6)* reverse 2.6 *(4.2)*, 3.2 *(5.1)*, 3.6 *(5.8)*, 4.4 *(7.1)*, 5.1 *(8.3)*, 6.3 *(10.2)*, 6.9 *(11.2)*, 8.5 *(13.7)* **Clutch** single dry disc hydraulically actuated by foot pedal **Brakes** wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 162" *(4.11 m)* left 162" *(4.11 m)*(on concrete surface without brake) right 169" *(4.30 m)* left 169" *(4.30 m)* **Turning space diameter** (on concrete surface with brake applied) right 341" *(8.66 m)* left 341" *(8.66 m)*(on concrete surface without brake) right 355" *(9.01 m)* left 355" *(9.01 m)* **Power take-off** 540 rpm at 2415 engine rpm and 997 rpm at 2400 engine rpm **Unladen tractor mass** 11770 lb *(5339 kg)*.

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 141°F *(60.7°C)*. Nine gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is as true and correct report of official Tractor Test No. **1589**, May 6, 1986.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

LUGGING ABILITY IN 9th (5L) GEAR

Crankshaft Speed rpm	2399	2160	1921	1687	1432	1206	958
Pull—lbs (kN)	5520 (24.55)	6187 (27.52)	6610 (29.40)	7076 (31.48)	7271 (32.33)	7383 (32.84)	7263 (32.31)
Increase in Pull %	0	12	20	28	32	34	32
Power—Hp (kW)	83.04 (61.92)	83.16 (62.01)	78.53 (58.56)	73.34 (54.69)	63.76 (47.55)	54.37 (40.54)	42.51 (31.70)
Speed—Mph (km/h)	5.64 (9.08)	5.04 (8.11)	4.46 (7.17)	3.89 (6.25)	3.29 (5.29)	2.76 (4.44)	2.19 (3.53)
Slip %	4.92	5.85	6.47	6.92	7.37	7.52	7.52

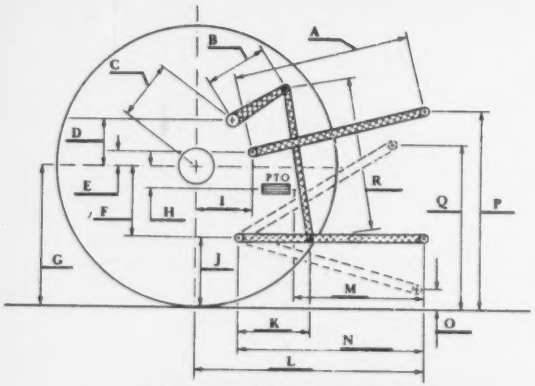
TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Disengaged dB(A)	Engaged dB(A)
Maximum Available Power—Two Hours		77.0
75% of Pull at Maximum Power—Ten Hours		77.5
50% of Pull at Maximum Power—Two Hours		76.5
50% of Pull at Reduced Engine Speed—Two Hours		72.0
Bystander in 16th (8H) gear	90.0	

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, pls & psi (kPa)	Two 18.4-38, 8, 16 (110)	Two 18.4-38, 8, 16 (110)
Ballast	—Liquid (each)	None	None
	—Iron (each)	58 lb (26 kg)	None
Front Tires	—No., size, pls & psi (kPa)	Two 16.9-24, 6, 16 (110)	Two 16.9-24, 6, 16 (150)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	120 lb (54 kg)	None
Height of Drawbar		20 in (510 mm)	20 in (510 mm)
Static Weight with Operator	—Rear	7860 lb (3565 kg)	7745 lb (3513 kg)
	—Front	4440 lb (2014 kg)	4200 lb (1905 kg)
	—Total	12300 lb (5579 kg)	11945 lb (5418 kg)

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	2350	(16200)
Location	pump	
Hydraulic oil temperature °F (°C)	152	(67)
Location	pump inlet	

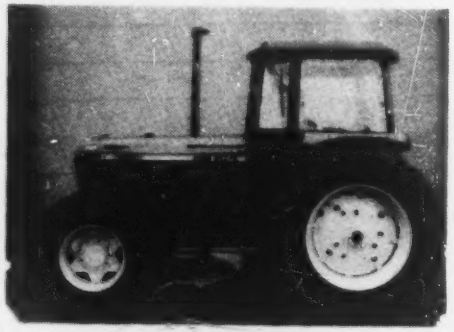
	Maximum Lift Capacity		Lift Capacity for Transport	
QUICK ATTACH	no		no	
CATEGORY	2		2	
Load lbs (kg)	6308	(2861)	1272	(1938)
TIME sec	3.41		2.48	
HITCH POINT MOVEMENT in (mm)				
Lowest position	12.7	(323)	8.0	(203)
Top of timed range	36.7	(932)	31.6	(803)
Highest position	36.7	(932)	31.6	(803)
LOAD CG MOVEMENT in (mm)				
Lowest position	12.1	(307)	8.0	(203)
Top of timed range	40.9	(1039)	33.7	(856)
Highest position	41.0	(1041)	33.7	(856)



Hitch Dimensions as Tested — No Load

	inch	mm
A	24.1	*613*
B	12.4	*315*
*C	13.2	*336*
D	13.2	*336*
E	6.9	*176*
F	9.9	*251*
G	32.1	*816*
H	2.8	*71*
I	18.5	*470*
J	22.3	*565*
K	22.2	*565*
L	43.3	*1101*
M	22.0	*560*
N	38.8	*986*
O	8.0	*203*
P	41.3	*1048*
Q	33.8	*857*
R	29.5	*749*

* rockshaft is ahead of rear axle.



John Deere 3150 Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1590—JOHN DEERE 4050 QUADRANGE DIESEL 16 SPEED

CHASSIS SERIAL NUMBERS RW4050H006510 AND HIGHER

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed — Two hours (PTO Speed — 1003 rpm)								
105.89 (78.96)	2201	6.147 (23.262)	0.407 (0.247)	17.23 (3.794)	196 (91.1)	57 (14.0)	74 (23.6)	28.69 (96.88)
VARYING POWER AND FUEL CONSUMPTION — Two Hours								
92.39 (68.89)	2258	5.621 (21.277)	0.426 (0.259)	16.44 (3.618)	192 (88.9)	59 (14.7)	79 (25.8)	.....
0.00 (0.00)	2374	1.982 (7.503)	....	....	....	56 (13.3)	74 (23.1)	.....
47.38 (35.33)	2317	3.737 (14.147)	0.553 (0.336)	12.68 (2.497)	185 (84.7)	59 (14.7)	79 (26.1)	.....
106.59 (79.48)	2200	6.113 (23.140)	0.402 (0.244)	17.44 (3.435)	196 (90.8)	62 (16.7)	76 (24.2)	.....
24.00 (17.90)	2348	2.928 (11.084)	0.855 (0.520)	8.20 (1.615)	181 (82.8)	64 (17.5)	75 (23.6)	.....
70.25 (52.39)	2292	4.662 (17.647)	0.465 (0.283)	15.07 (2.969)	187 (85.8)	63 (17.2)	76 (24.2)	.....
Av **56.77** *Av (42.33)*	**2296**	**4.174** *(15.800)*	**0.515** *(0.313)*	**13.60** *(2.679)*	**190** *(86.6)*	**60** *(15.7)*	**76** *(24.5)*	**28.65** *(96.76)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power — Two Hours 7th (B2) Gear											
94.99 (70.83)	6085 (27.07)	5.85 (9.42)	2199	4.88	6.193 (23.443)	0.457 (0.278)	15.34 (3.021)	191 (88.1)	58 (14.4)	68 (19.7)	28.91 (97.61)
75% of Pull at Maximum Power — Ten Hours 7th (B2) Gear											
75.80 (56.53)	4617 (20.54)	6.16 (9.91)	2285	3.72	5.318 (20.132)	0.492 (0.299)	14.25 (2.808)	185 (85.0)	56 (13.6)	65 (17.2)	28.86 (98.77)
50% of Pull at Maximum Power — Two Hours 7th (B2) Gear											
51.85 (38.67)	3081 (13.70)	6.31 (10.16)	2313	2.47	4.274 (16.178)	0.578 (0.351)	12.13 (2.390)	185 (85.0)	58 (14.4)	72 (21.9)	28.91 (97.61)
50% of Pull at Reduced Engine Speed — Two Hours 12th (B4) Gear											
51.84 (38.66)	3081 (13.70)	6.31 (10.16)	1399	2.45	5.332 (12.613)	0.450 (0.274)	15.56 (3.065)	184 (84.4)	57 (13.6)	71 (21.7)	28.89 (97.56)
MAXIMUM POWER IN SELECTED GEARS											
71.75 (53.51)	11381 (50.62)	2.36 (3.81)	2277	14.62	2nd (A2) Gear			186 (85.6)	62 (16.7)	66 (18.9)	28.62 (96.85)
88.45 (65.96)	10816 (48.11)	3.07 (4.94)	2202	11.99	3rd (A3) Gear			188 (86.7)	62 (16.7)	66 (18.9)	28.63 (96.88)
93.20 (69.50)	8573 (38.13)	4.08 (6.56)	2202	7.84	4th (A4) Gear			191 (88.3)	62 (16.7)	66 (18.9)	28.64 (96.91)
94.17 (70.22)	7825 (34.81)	4.51 (7.26)	2201	6.89	5th (B1) Gear			191 (88.1)	63 (17.2)	65 (18.3)	28.68 (96.85)
94.14 (70.20)	6506 (28.94)	5.43 (8.73)	2200	5.55	6th (C1) Gear			190 (87.8)	62 (16.7)	66 (18.9)	28.68 (96.85)
96.35 (71.85)	6167 (27.43)	5.86 (9.43)	2201	4.92	7th (B2) Gear			192 (88.6)	57 (13.9)	69 (20.6)	28.91 (97.84)
96.03 (71.61)	5159 (22.86)	7.01 (11.28)	2202	4.06	8th (C2) Gear			187 (86.1)	56 (13.3)	61 (16.1)	28.86 (97.66)
94.99 (70.84)	4616 (20.53)	7.72 (12.42)	2199	3.67	9th (B3) Gear			187 (86.1)	57 (13.9)	63 (17.2)	28.88 (97.52)
93.40 (69.65)	4104 (18.26)	8.53 (13.73)	2199	3.27	10th (D1) Gear			188 (86.7)	58 (14.4)	64 (17.8)	28.89 (97.56)

Department of Agricultural Engineering

Dates of Test: April 1 to 9, 1986

Manufacturer: JOHN DEERE TRACTOR WORKS, P.O. Box 3500, Waterloo, Iowa 50704

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.9 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8117 **Fuel weight** 7.008 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 3.991 gal *(15.107 l)* **Drained from motor** 3.831 gal *(14.501 l)* **Transmission and final drive lubricant** John Deere Hygard transmission and hydraulic fluid **Total time engine was operated** 35.5 hours.

ENGINE: **Make** John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *CD6359T681989* **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 4.19" × 4.33" *(106.5 mm × 110 mm)* **Compression ratio** 17.8 to 1 **Displacement** 359 cu in *(5883 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: **Type** standard with duals **Serial No.** *RW4050H006554* **Tread width** rear 60" *(1524 mm)* to 128.7" *(3269 mm)* front 58" *(1473 mm)* to 82" *(2083 mm)* **Wheel base** 106.7" *(2710 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 30.4" *(772 mm)* Vertical distance above roadway 45.0" *(1143 mm)* Horizontal distance from center of rear wheel tread 0.4" *(10 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 2.1 *(3.4)* second 2.7 *(4.3)* third 3.4 *(5.5)* fourth 4.4 *(7.0)* fifth 4.8 *(7.7)* sixth 5.7 *(9.1)* seventh 6.1 *(9.8)* eighth 7.2 *(11.6)* ninth 7.9 *(12.7)* tenth 8.7 *(14.0)* eleventh 9.4 *(15.1)* twelfth 10.1 *(16.2)* thirteenth 11.1 *(17.8)* fourteenth 11.9 *(19.2)* fifteenth 14.4 *(23.2)*, sixteenth 18.3 *(29.4)* reverse 3.3 *(5.4)*, 4.2 *(6.8)*, 7.7 *(12.3)*, 9.1 *(14.6)*, 9.7 *(15.7)*, 11.5 *(18.6)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 146" *(3.7 m)* left 146" *(3.7 m)*(on concrete surface without brake) right 157" *(4.0 m)* left 157"

LUGGING ABILITY IN 7th (B2) GEAR

Crankshaft Speed rpm	2201	1981	1751	1537	1328	1091
Pull—lbs (kN)	6167 (27.43)	6942 (30.88)	7820 (34.79)	8197 (36.46)	7925 (35.24)	7255 (32.27)
Increase in Pull %	0	13	27	33	28	18
Power—Hp (kW)	96.35 (71.85)	96.63 (72.06)	95.16 (70.96)	87.12 (64.96)	73.01 (54.44)	55.26 (41.21)
Speed—Mph (km/h)	5.86 (9.43)	5.22 (8.40)	4.56 (7.34)	3.99 (6.41)	3.46 (5.56)	2.86 (4.60)
Slip %	4.92	5.84	6.89	7.33	7.03	6.44

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	73.0
75% of Pull at Maximum Power—Ten Hours	73.5
50% of Pull at Maximum Power—Two Hours	74.5
50% of Pull at Reduced Engine Speed—Two Hours	71.0
Bystander in 16th (D4) gear	86.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, pls & psi (kPa)	Four 18.4-38, 6, 12 (85)	Four 18.4-38, 6, 12 (83)
Ballast	—Liquid (each tire)	577 lb (262 kg)	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, pls & psi (kPa)	Two 11.00-16, 8, 40 (275)	Two 11.00-16, 8, 40 (275)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	63 lb (29 kg)	None
Height of Drawbar		23 in (585 mm)	23 in (585 mm)
Static Weight with Operator	—Rear	10020 lb (4545 kg)	8865 lb (4021 kg)
	—Front	3650 lb (1656 kg)	3525 lb (1599 kg)
	—Total	15670 lb (6201 kg)	12390 lb (5620 kg)

(4.0 m) Turning space diameter (on concrete surface with brake applied) right 302" *(7.67 m)* left 302" *(7.67 m)*(on concrete surface without brake) right 338" *(8.58 m)* left 338" *(8.58 m)* **Power take-off** 540 rpm at 2201 engine rpm and 1003 rpm at 2261 engine rpm **Unladen tractor mass** 11105 lb *(5037 kg)*.

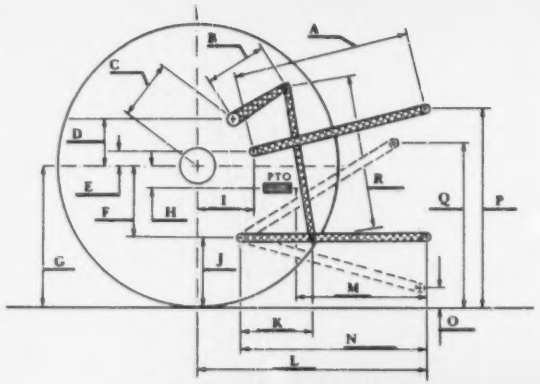
REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 150°F *(65.7°C)*. Nine gears were chosen between 15% slip and 19 mph *(16.1 km/h)*. The performance figures on this report apply to chassis serial numbers RW4050H006510 and higher.

We, the undersigned, certify that this is as true and correct report of official Tractor Test No. **1590**, May 6, 1986.

LOUIS I. LEVITICUS
Engineer-in-Charge

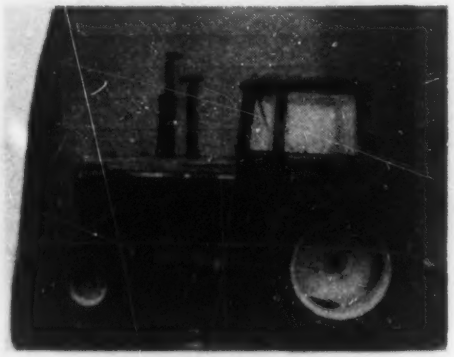
K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	28.1	*714*
B	11.5	*292*
*C	11.3	*287*
D	10.9	*278*
E	5.5	*140*
F	10.2	*259*
G	31.5	*799*
H	5.5	*140*
I	13.5	*343*
J	21.3	*540*
K	23.1	*587*
L	41.2	*1046*
M	21.5	*547*
N	36.7	*932*
O	8.0	*203*
P	40.3	*1022*
Q	35.3	*895*
R	33.0	*838*

* rockshaft is ahead of rear axle.



John Deere 4050 Quadrange Diesel

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	2300	(15860)
Location	pressure control valve	
Hydraulic oil temperature °F (°C)	148	(64)
Location	pump inlet	

	Maximum Lift Capacity		Lift Capacity for Transport		Maximum Lift Capacity with optional boost cylinder	
QUICK ATTACH	no		no		no	
CATEGORY	2		2		2	
Load lbs (kg)	**5965	(2706)	4450	(2018)	***7230	(3279)
TIME sec	8.05		1.91		5.69	
HITCH POINT MOVEMENT in (mm)						
Lowest position	11.8	(300)	8.0	(203)	11.9	(302)
Top of timed range	35.8	(909)	32.3	(820)	35.9	(912)
Highest position	36.4	(925)	32.3	(820)	36.3	(927)
LOAD CG MOVEMENT in (mm)						
Lowest position	9.8	(249)	5.8	(147)	9.8	(249)
Top of timed range	38.7	(983)	34.2	(869)	38.8	(986)
Highest position	39.8	(1011)	34.2	(869)	39.6	(1006)

**The manufacturer's claimed capacity was 6294 lbs (2855 kg).
***The manufacturer's claimed capacity was 7410 lbs (3362 kg).

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1591—JOHN DEERE 4050 POWERSHIFT DIESEL 15 SPEED

CHASSIS SERIAL NUMBERS RW4050P006510 AND HIGHER

POWER TAKE-OFF PERFORMANCE

	Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp hr (kg/kW h)	Hp hr/gal (kW h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed — Two hours (PTO Speed — 1003 rpm)									
	105.69 (78.81)	2200	6.074 (22.992)	0.403 (0.245)	17.40 (3.428)	205 (96.2)	70 (20.9)	75 (23.9)	28.63 (96.88)
VARYING POWER AND FUEL CONSUMPTION — Two Hours									
	92.13 (68.70)	2257	5.535 (20.953)	0.421 (0.256)	16.64 (3.279)	198 (92.2)	70 (20.8)	75 (23.9)	....
	0.00 (0.00)	2367	1.969 (7.454)	....	....	179 (81.7)	69 (20.6)	75 (23.6)	....
	47.50 (35.27)	2516	5.664 (13.871)	0.543 (0.330)	12.91 (2.543)	182 (83.3)	69 (20.6)	75 (23.6)	....
	106.56 (79.31)	2201	6.052 (22.832)	0.397 (0.242)	17.63 (3.474)	198 (92.2)	70 (21.1)	75 (23.9)	....
	23.90 (17.82)	2542	2.872 (10.873)	0.842 (0.512)	8.32 (1.639)	180 (82.2)	71 (21.4)	75 (23.9)	....
	70.38 (52.48)	2289	4.598 (17.404)	0.458 (0.278)	13.31 (3.015)	186 (85.3)	71 (21.7)	76 (24.2)	....
Av	**56.68**	**2295**	**4.112**	**0.508**	**15.78**	**187**	**70**	**75**	**28.65**
for	**(42.26)**		**(15.563)**	**(0.309)**	**(2.715)**	**(86.2)**	**(21.0)**	**(23.8)**	**(96.76)**

DRAWBAR PERFORMANCE

	Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp hr (kg/kW h)	Hp hr/gal (kW h/l)	Temp °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power — Two Hours 10th Gear												
	88.28 (65.83)	5195 (23.11)	6.37 (10.26)	2200	4.09	6.043 (22.876)	0.480 (0.292)	14.61 (2.878)	198 (92.2)	55 (12.7)	70 (21.1)	28.84 (97.59)
75% of Pull at Maximum Power — Ten Hours 10th Gear												
	70.09 (52.27)	3946 (17.55)	6.66 (10.72)	2271	2.90	5.204 (19.699)	0.520 (0.317)	13.47 (2.653)	188 (86.8)	56 (13.5)	67 (19.6)	28.68 (96.85)
50% of Pull at Maximum Power — Two Hours 10th Gear												
	47.83 (35.67)	2631 (11.70)	6.82 (10.97)	2307	2.13	4.352 (16.475)	0.638 (0.388)	10.99 (2.165)	182 (83.3)	53 (11.7)	56 (13.9)	29.03 (98.11)
50% of Pull at Reduced Engine Speed — Two Hours 15th Gear												
	47.75 (35.61)	2632 (11.71)	6.80 (10.95)	1407	2.17	3.289 (12.451)	0.483 (0.294)	14.52 (2.860)	181 (82.5)	38 (3.3)	41 (5.0)	29.05 (98.16)
MAXIMUM POWER IN SELECTED GEARS												
	79.21 (59.06)	11378 (50.61)	2.61 (4.20)	2233	14.61	4th Gear			184 (84.2)	50 (14.4)	65 (17.2)	29.05 (98.19)
	85.79 (63.97)	10342 (46.00)	5.11 (8.01)	2201	10.45	5th Gear			185 (85.0)	61 (15.0)	67 (18.3)	29.04 (98.06)
	89.47 (66.72)	9425 (41.92)	3.56 (5.73)	2199	9.62	6th Gear			195 (90.6)	51 (10.6)	68 (20.0)	28.91 (97.62)
	89.17 (66.49)	7908 (35.44)	4.20 (6.75)	2198	7.34	7th Gear			197 (91.4)	51 (10.6)	68 (20.0)	28.91 (97.62)
	87.27 (65.07)	6843 (30.44)	4.78 (7.70)	2202	6.00	8th Gear			193 (89.4)	51 (10.6)	68 (20.0)	28.90 (97.59)
	87.81 (65.48)	5921 (26.34)	5.56 (8.95)	2198	4.94	9th Gear			196 (90.8)	52 (11.1)	68 (20.0)	28.89 (97.56)
	89.42 (66.68)	5261 (23.40)	6.37 (10.26)	2205	4.16	10th Gear			197 (91.4)	52 (11.1)	68 (20.0)	28.87 (97.49)
	88.98 (66.35)	4523 (20.12)	7.38 (11.87)	2200	3.69	11th Gear			198 (91.9)	52 (11.1)	68 (20.0)	28.89 (97.56)
	91.64 (68.34)	4040 (17.97)	8.51 (13.69)	2199	3.06	12th Gear			196 (91.1)	52 (11.1)	68 (20.0)	28.88 (97.52)

Department of Agricultural Engineering

Dates of Test: April 1 to 16, 1986

Manufacturer: JOHN DEERE TRACTOR WORKS, P.O. Box 3500, Waterloo, Iowa 50704

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.9 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8417 **Fuel weight** 7.008 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 4.022 gal *(15.224 l)* **Drained from motor** 3.845 gal *(14.554 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 38.5 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *CD6359T681088* **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 4.19" × 4.33" *(106.5 mm × 110 mm)* **Compression ratio** 17.8 to 1 **Displacement** 359 cu in *(5883 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: Type standard with duals **Serial No.** *RW4050P006572* **Tread width** rear 60" *(1524 mm)* to 128.7" *(3269 mm)* front 58" *(1473 mm)* to 82" *(2083 mm)* **Wheel base** 106.7" *(2710 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 30.7" *(780 mm)* Vertical distance above roadway 45.0" *(1143 mm)* Horizontal distance from center of rear wheel tread 0.4" *(10 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph** *(km/h)* first 1.4 *(2.2)* second 2.0 *(3.2)* third 2.3 *(3.7)* fourth 3.0 *(4.8)* fifth 3.4 *(5.5)* sixth 3.9 *(6.3)* seventh 4.5 *(7.2)* eighth 5.0 *(8.1)* ninth 5.8 *(9.3)* tenth 6.6 *(10.6)* eleventh 7.6 *(12.2)* twelfth 8.7 *(14.0)* thirteenth 10.8 *(17.3)* fourteenth 14.7 *(23.7)* fifteenth 18.2 *(29.3)* reverse 1.7 *(2.7)*, 2.4 *(3.9)*, 3.6 *(5.9)*, 5.5 *(8.8)* **Clutch** wet multiple disc hydraulically power actuated by foot pedal **Brakes** wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 146" *(3.7 m)* left 146" *(3.7 m)* (on concrete surface without brake) right 157" *(4.0 m)* left 157" *(4.0 m)* **Turning space diameter** (on concrete surface with brake applied) right 302" *(7.67 m)* left 302" *(7.67 m)* (on concrete surface without brake) right 338" *(8.58 m)* left 338" *(8.58 m)* **Power take-off** 540 rpm at 2201 and 1003 rpm at 2200 engine rpm **Unladen tractor mass** 11400 lb *(5171 kg)*.

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2203	1976	1761	1549	1314	1103
Pull—lbs (kN)	5261 (23.40)	6131 (27.27)	6609 (29.40)	6949 (30.91)	7019 (31.22)	6612 (29.41)
Increase in Pull %	0	17	26	32	33	26
Power—Hp (kW)	80.42 (59.97)	92.65 (69.09)	88.53 (66.02)	81.48 (60.76)	69.76 (52.02)	55.58 (41.10)
Speed—Mph (km/h)	6.37 (10.26)	5.67 (9.12)	5.02 (8.08)	4.40 (7.08)	3.73 (6.00)	3.14 (5.06)
Slip %	4.16	5.09	5.40	6.00	6.15	5.70

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	74.5
75% of Pull at Maximum Power—Ten Hours	74.5
50% of Pull at Maximum Power—Two Hours	75.0
50% of Pull at Reduced Engine Speed—Two Hours	72.5
Bystander in 15th gear	88.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	four 18.4-38, 6, 12 (85)	Four 18.4-38, 6, 12 (85)
Ballast	—Liquid (each inner)	432 lb (196 kg)	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi (kPa)	Two 11.00-16, 8, 40 (275)	Two 11.00-16, 8, 40 (275)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	68 lb (31 kg)	None
Height of Drawbar		25 in (585 mm)	25 in (585 mm)
Static Weight with Operator	—Rear	9950 lb (4513 kg)	9085 lb (4121 kg)
	—Front	3735 lb (1694 kg)	3600 lb (1633 kg)
	—Total	13685 lb (6207 kg)	12985 lb (5754 kg)

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	2350	(16200)
Location	pressure control valve	
Hydraulic oil temperature °F (°C)	145	(63)
Location	pump inlet	

	Maximum Lift Capacity		Lift Capacity for Transport		Maximum Lift Capacity with optional boost cylinder	
QUICK ATTACH	no		no		no	
CATEGORY	2		2		2	
Load lbs (kg)	**6060	(2743)	4452	(2019)	***7220	(3275)
TIME sec	7.67		2.06		8.55	
HITCH POINT MOVEMENT in (mm)						
Lowest position	11.3	(287)	8.0	(203)	11.3	(287)
Top of timed range	35.3	(897)	32.7	(831)	35.3	(897)
Highest position	36.4	(925)	32.7	(831)	36.2	(919)
LOAD CG MOVEMENT in (mm)						
Lowest position	10.0	(254)	6.5	(165)	9.9	(251)
Top of timed range	38.6	(980)	35.2	(894)	38.8	(986)
Highest position	40.2	(1021)	35.2	(894)	40.2	(1021)

**The manufacturer's claimed capacity was 6244 lbs (2833 kg)
***The manufacturer's claimed capacity was 7418 lbs (3365 kg)

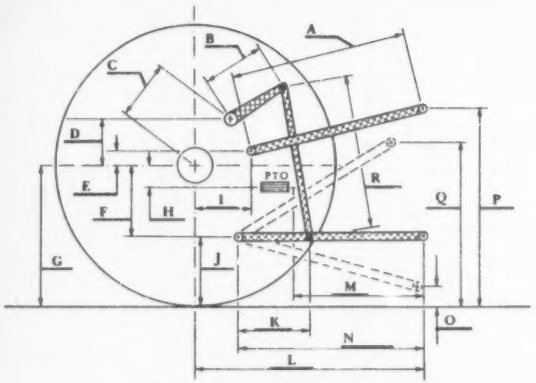
REPAIRS AND ADJUSTMENTS: Following the PTO test, the fuel shut off control cable was replaced.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 152°F *(66.8°C)*. Nine gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. The performance figures on this report apply to chassis serial numbers RW4050P006510 and higher.

We, the undersigned, certify that this is an true and correct report of official Tractor Test No. **1591**, May 6, 1986.

LOUIS I. LEVITICUS
Engineer-in-Charge

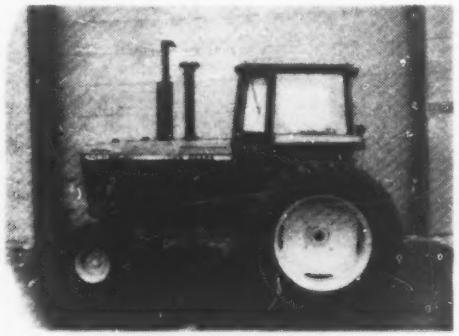
K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	27.4	695
B	11.5	292
*C	11.3	287
D	10.9	278
E	5.5	140
F	10.2	259
G	31.7	805
H	5.5	140
I	13.5	343
J	21.5	546
K	23.1	587
L	41.2	1046
M	21.5	547
N	36.7	932
O	8.0	203
P	40.5	1029
Q	35.0	889
R	33.0	838

* tockshaft is ahead of rear axle



John Deere 4050 Powershift Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1592—STEIGER BEARCAT 1000 DIESEL 12 SPEED (CATERPILLAR ENGINE)

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp·hr (kg/kW·h)	Hp·hr/gal (kW·h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed — Two hours (PTO Speed — 1001 rpm)								
218.00 (162.56)	2100	13.126 (49.688)	0.422 (0.257)	16.61 (3.272)	186 (85.6)	63 (17.4)	76 (24.4)	28.74 (97.03)
VARYING POWER AND FUEL CONSUMPTION — Two Hours								
190.59 (142.12)	2160	12.047 (45.603)	0.443 (0.270)	15.82 (3.116)	185 (85.6)	69 (20.3)	77 (25.0)	.....
0.00 (0.00)	2271	5.698 (13.997)	.....	.....	180 (82.2)	69 (20.3)	76 (24.2)	.....
98.16 (73.19)	2223	7.708 (29.176)	0.550 (0.335)	12.74 (2.509)	181 (82.5)	69 (20.6)	76 (24.2)	.....
218.76 (163.13)	2100	13.100 (49.588)	0.420 (0.253)	16.70 (3.290)	186 (85.6)	74 (23.3)	78 (25.6)	.....
49.45 (36.88)	2248	5.919 (22.405)	0.839 (0.510)	8.36 (1.646)	180 (82.2)	70 (21.1)	77 (25.0)	.....
145.22 (108.29)	2195	9.890 (37.438)	0.477 (0.290)	11.68 (2.301)	181 (82.5)	70 (20.8)	78 (25.6)	.....
Av 117.05 (87.27)	**2200**	**8.727** (33.035)	**0.523** (0.318)	**13.41** (2.642)	**182** (83.3)	**70** (21.1)	**77** (24.9)	**28.70** (96.93)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp·hr (kg/kW·h)	Hp·hr/gal (kW·h/l)	Temp °F (°C) Cool ing med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power — Two Hours 7th Gear											
192.82 (143.79)	10935 (48.64)	6.61 (10.64)	2100	2.40	13.138 (49.734)	0.478 (0.291)	14.68 (2.891)	186 (85.6)	65 (18.1)	73 (22.8)	28.63 (96.66)
75% of Pull at Maximum Power — Ten Hours 7th Gear											
152.40 (113.65)	8302 (36.93)	6.88 (11.08)	2173	1.87	11.228 (42.504)	0.516 (0.314)	13.57 (2.674)	183 (83.9)	64 (17.8)	72 (22.0)	28.58 (97.17)
50% of Pull at Maximum Power — Two Hours 7th Gear											
103.76 (77.37)	5535 (24.62)	7.03 (11.31)	2207	1.27	8.944 (33.858)	0.604 (0.369)	11.60 (2.285)	182 (83.3)	66 (18.9)	74 (23.3)	28.73 (97.80)
50% of Pull at Reduced Engine Speed — Two Hours 9th Gear											
103.81 (77.41)	5536 (24.62)	7.05 (11.32)	1494	1.51	7.118 (26.946)	0.481 (0.292)	11.58 (2.283)	181 (82.8)	68 (20.0)	79 (25.8)	28.72 (96.98)

MAXIMUM POWER IN SELECTED GEARS

169.55 (126.44)	28566 (127.07)	2.23 (3.58)	2139	14.54	2nd Gear	181 (82.8)	63 (17.2)	67 (19.4)	28.71 (96.95)
187.98 (140.17)	24098 (107.15)	2.93 (4.71)	2101	7.11	3rd Gear	183 (83.9)	64 (17.8)	73 (22.8)	28.63 (96.68)
193.53 (144.32)	19809 (88.11)	3.66 (5.90)	2101	1.97	4th Gear	183 (83.9)	64 (17.8)	73 (22.9)	28.61 (96.61)
195.49 (145.78)	16472 (73.27)	4.45 (7.16)	2101	5.86	5th Gear	185 (85.0)	64 (17.8)	73 (22.8)	28.60 (96.58)
194.51 (145.05)	13215 (58.77)	5.52 (8.88)	2098	2.89	6th Gear	186 (85.6)	64 (17.8)	73 (22.8)	28.60 (96.58)
195.08 (145.47)	11069 (49.24)	6.61 (10.64)	2098	2.40	7th Gear	186 (85.6)	64 (17.8)	73 (22.8)	28.63 (96.68)
193.66 (144.41)	9107 (40.51)	7.97 (12.83)	2100	1.90	8th Gear	186 (85.6)	67 (19.4)	76 (24.4)	28.69 (96.88)
190.05 (141.72)	7231 (32.17)	9.86 (15.86)	2101	1.48	9th Gear	185 (84.7)	66 (18.9)	75 (23.9)	28.69 (96.88)

Department of Agricultural Engineering

Dates of Test: May 6 to 13, 1986

Manufacturer: STEIGER TRACTOR, INC., 406 Main Avenue, Fargo, North Dakota 58126

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.9 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8419 **Fuel weight** 7.010 lb/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CD-SF/CC **To motor** 5.892 gal *(22.303 l)* **Drained from motor** 5.237 gal *(19.824 l)* **Transmission and hydraulic lubricant** Steiger hydraulic transmission oil **Final drive lubricant** SAE 80W-90 gear oil API GL-5 **Total time engine was operated** 39.0 hours

ENGINE: Make Caterpillar Diesel **Type** six cylinder vertical with turbocharger **Serial No.** 64704445 **Crankshaft** lengthwise **Rated rpm** 2100 **Bore and stroke** 4.75" × 6.00" *(120.7 mm × 152.4 mm)* **Compression ratio** 15.0 to 1 **Displacement** 638 cu in *(10455 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic oil, radiator for transmission oil **Fuel filter** one paper cartridge and prestrainer **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type four wheel drive with duals **Serial No.** C09-6091 **Tread width** rear 64" *(1625 mm)* to 130" *(3302 mm)* front 64" *(1625 mm)* to 130" *(3302 mm)* **Wheel base** 130" *(3302 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 72.0" *(1829 mm)* Vertical distance above roadway 46.0" *(1168 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph** *(km/h)* first 2.0 *(3.3)* second 2.5 *(3.9)* third 3.0 *(4.9)* fourth 3.7 *(5.9)* fifth 4.4 *(7.1)* sixth 5.5 *(8.8)* seventh 6.5 *(10.5)* eighth 7.8 *(12.5)* ninth 9.6 *(15.4)* tenth 11.7 *(18.9)* eleventh 14.1 *(22.7)* twelfth 17.3 *(27.9)* reverse 2.7 *(4.3)*, 4.8 *(7.8)* **Clutch** wet multiple disc hydraulically power actuated by foot pedal **Brakes** caliper disc hydraulically operated by foot pedal **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 240" *(6.1 m)* left 240" *(6.1 m)* **Turning space diameter** (on concrete surface without brake) right 501" *(12.7 m)* left 501" *(12.7 m)* **Power take-off** 1001 rpm at 2100 engine rpm **Unladen tractor mass** 25395 lb *(11519 kg)*

LUGGING ABILITY IN 7th GEAR

Crankshaft Speed rpm	2098	1887	1684	1466	1253	1049
Pull—lbs	11869	12823	13339	14851	14673	13199
(kN)	*(49.24)*	*(57.03)*	*(62.78)*	*(66.06)*	*(66.16)*	*(62.26)*
Increase in Pull %	0	16	30	34	34	28
Power—Hp	195.08	202.37	201.10	181.05	154.99	124.03
(kW)	*(145.47)*	*(150.91)*	*(149.96)*	*(135.01)*	*(115.58)*	*(92.49)*
Speed—Mph	6.61	5.92	5.26	4.57	3.91	3.28
(km/h)	*(10.64)*	*(9.53)*	*(8.46)*	*(7.36)*	*(6.29)*	*(5.27)*
Slip %	2.40	2.89	3.22	3.38	3.38	3.38

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	78.5
75% of Pull at Maximum Power—Ten Hours	77.0
50% of Pull at Maximum Power—Two Hours	77.5
50% of Pull at Reduced Engine Speed—Two Hours	76.0
Bystander in 12th gear	89.5

TIRES, BALLAST AND WEIGHT		Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	four 23.1-34, 8, inner 14 (95) outer 12 (85)
Ballast	—Liquid (each)	None
	—Cast Iron (each)	None
Front Tires	—No., size, ply & psi *(kPa)*	four 23.1-34, 8, inner 14 (95) outer 12 (85)
Ballast	—Liquid (each)	None
	—Cast Iron (each)	None
Height of Drawbar		17 in. (435 mm)
Static Weight with Operator—Rear		12880 lb. (5842 kg)
	—Front	15695 lb. (7119 kg)
	—Total	28575 lb. (12961 kg)

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi *(kPa)*	2500	*(17240)*	
Location	remote outlet		
Hydraulic oil temperature °F *(°C)*	133	*(56)*	
Location	charge pump inlet		
	Maximum Lift Capacity		**Lift Capacity for Transport**
QUICK ATTACH	yes		
CATEGORY	3		*not measured
LOAD lbs *(kg)*	12764	*(5790)*	
TIME sec	3.93		
HITCH POINT MOVEMENT in *(mm)*			
Lowest position	14.4	*(366)*	
Top of timed range	40.4	*(1026)*	
Highest position	40.5	*(1029)*	
LOAD CG MOVEMENT in *(mm)*			
Lowest position	11.6	*(372)*	
Top of timed range	42.3	*(1074)*	
Highest position	42.4	*(1077)*	

*Implement load capacity for transport purposes not specified by manufacturer

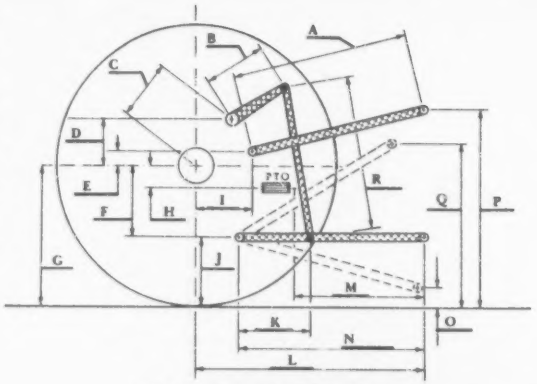
REPAIRS AND ADJUSTMENTS: Before starting the drawbar tests, the brake clearance was adjusted.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or Official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 145°F *(62.8°C)*. Eight gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. The performance figures on this report apply to Bearcat 1000 models equipped with Caterpillar Diesel engines.

We, the undersigned, certify that this is an true and correct report of official Tractor Test No. **1592**, June 13, 1986.

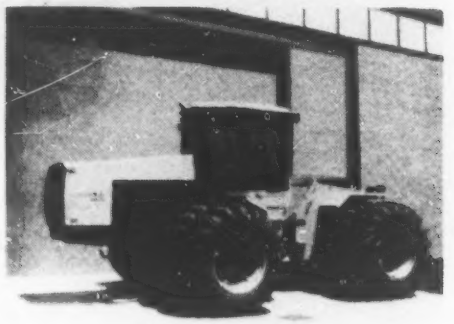
LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	mm
A	29.1	*740*
B	21.0	*533*
C	25.8	*654*
D	25.1	*638*
E	11.4	*289*
F	9.9	*251*
G	32.7	*829*
H	9.6	*243*
I	23.3	*591*
J	22.8	*578*
K	23.0	*584*
L	52.7	*1338*
L'	57.7	*1465*
M	25.0	*635*
N	42.0	*1067*
O	8.0	*203*
P	44.8	*1137*
Q	39.6	*1006*
R	35.5	*902*



Steiger Bearcat 1000 Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1593 — STEIGER COUGAR 1000 DIESEL 12 SPEED (CATERPILLAR ENGINE)

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel consumption gal/hr (L/hr)	lb/hp-hr (kg/kW-h)	Hp-hr/gal (kW-h/L)	Cooling water °F (°C)	Air °F (°C)	Oil °F (°C)	Barometer in Hg (kPa)
Rated Engine Speed — Two hours (PTO Speed — 1001 rpm)								
372.98 (278.15)	2100	11.031 (41.76)	0.496 (0.302)	12.27 (3.24)	191 (88)	64 (18)	192 (89)	28.79 (97.51)
VARYING POWER AND FUEL CONSUMPTION — Two Hours								
225.92 (168.47)	2148	13.334 (50.47)	0.421 (0.256)	16.07 (4.24)	193 (90)	66 (19)	191 (88)	
0.00 (0.00)	2253	3.293 (12.463)			190 (88)	66 (19)	192 (89)	
115.97 (86.48)	2199	8.146 (30.828)	0.531 (0.323)	13.73 (3.506)	190 (88)	66 (19)	194 (90)	
260.95 (194.59)	2100	11.996 (45.407)	0.403 (0.245)	17.40 (4.429)	193 (89)	67 (19)	90 (32)	
58.69 (43.76)	2251	6.216 (23.532)	0.743 (0.452)	9.44 (2.360)	193 (89)	65 (18)	90 (32)	
171.93 (128.22)	2177	10.881 (41.194)	0.444 (0.270)	15.80 (3.949)	192 (89)	66 (19)	92 (33)	
Av 150.91 (112.55)	**2186**	**9.648 (36.523)**	**0.487 (0.296)**	**14.49 (3.816)**	**191 (88.6)**	**65 (19)**	**79 (26.0)**	**28.79 (97.51)**

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel consumption gal/hr (L/hr)	lb/hp-hr (kg/kW-h)	Hp-hr/gal (kW-h/L)	Cool. °F (°C)	Air °F (°C)	Oil °F (°C)	Barom. in Hg (kPa)
Maximum Available Power — Two Hours 7th Gear											
225.27 (167.98)	12820 (57.01)	6.59 (10.60)	2099	2.71 (0.96)	11.846 (44.844)	0.462 (0.281)	15.57 (4.109)	191 (88)	68 (20)	193 (89)	28.81 (97.56)
75% of Pull at Maximum Power — Ten Hours 7th Gear											
178.90 (133.41)	9830 (43.73)	6.82 (10.98)	2157	1.92 (0.69)	12.401 (46.951)	0.490 (0.298)	14.31 (3.775)	191 (88)	67 (19)	192 (89)	28.84 (97.67)
50% of Pull at Maximum Power — Two Hours 7th Gear											
122.93 (90.92)	6554 (29.15)	6.98 (11.23)	2191	1.33 (0.48)	9.733 (36.845)	0.560 (0.341)	12.57 (3.316)	193 (89)	67 (19)	73 (23)	28.77 (97.42)
50% of Pull at Reduced Engine Speed — Two Hours 9th Gear											
123.86 (90.87)	6553 (29.15)	6.92 (11.23)	1785 (1785)	1.33 (0.48)	8.108 (30.696)	0.467 (0.284)	15.01 (3.960)	192 (89)	70 (21)	76 (24)	28.83 (97.61)
MAXIMUM POWER IN SELECTED GEARS											
181.11 (135.16)	30891 (137.51)	2.23 (3.59)	2140	11.19	2nd Gear			193 (89)	61 (16)	63 (17)	28.83 (97.61)
218.71 (163.10)	28632 (127.41)	2.86 (4.61)	2098	8.89	3rd Gear			191 (88)	64 (18)	68 (20)	28.80 (97.51)
227.75 (169.83)	23360 (103.93)	3.61 (5.81)	2099	5.53	4th Gear			191 (88)	65 (18)	69 (20)	28.80 (97.51)
229.29 (170.98)	19413 (86.37)	4.33 (6.97)	2100	3.28	5th Gear			191 (88)	65 (18)	69 (20)	28.80 (97.51)
228.91 (170.70)	15602 (69.40)	5.50 (8.85)	2097	3.40	6th Gear			191 (88)	66 (19)	71 (21)	28.80 (97.51)
230.38 (171.81)	13107 (58.30)	6.59 (10.60)	2099	2.73	7th Gear			191 (88)	67 (19)	73 (23)	28.80 (97.51)
227.77 (169.85)	10769 (47.90)	7.93 (12.76)	2096	2.17	8th Gear			191 (88)	68 (20)	74 (23)	28.80 (97.51)
222.96 (166.26)	8537 (37.96)	9.82 (15.80)	2098	1.67	9th Gear			191 (88)	71 (21)	76 (24)	28.80 (97.51)

Department of Agricultural Engineering

Dates of Test: May 7 to 15, 1986

Manufacturer: STEIGER TRACTOR, INC., Box 1406, Main Avenue, Fargo, North Dakota 58126.

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel. **Cetane No.** 46.7 (rating taken from oil company's inspection data). **Specific gravity** converted to 60/60 °F (15.5/15.5 °C). **Fuel weight** 7.012 lb/gal (0.840 kg/l). **Oil** SAE 15W-40. **API service classification** CD/SF. **To motor** 6.5 gal (24.599 l). **Drained from motor** 5.801 gal (21.959 l). **Transmission and hydraulic lubricant** Steiger hydraulic transmission oil. **Final drive lubricant** SAE 80W-90 gear oil API GL-5. **Total time engine was operated** 34.0 hours.

ENGINE: **Make** Caterpillar Diesel. **Type** six cylinder vertical with turbocharger and intercooler. **Serial No.** 61J01600. **Crankshaft** longitudinal. **Rated rpm** 2100. **Bore and stroke** 5.75 × 6.00 in (120.7 mm × 152.4 mm). **Compression ratio** 15.0 to 1. **Displacement** 638 cu in (10.455 cc). **Starting system** 12 volt. **Lubrication** pressure. **Air cleaner** two paper elements and aspirator. **Oil filter** one full flow cartridge. **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic oil, radiator for transmission oil. **Fuel filter** one paper cartridge and primer. **Muffler** vertical. **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** four wheel drive with dually. **Serial No.** 4 11 3892. **Tread width** rear 84 in (2.134 mm) to 140 in (3.562 mm) front 84 in (2.134 mm) to 140 in (3.562 mm). **Wheel base** 130 in (3.302 mm). **Center of gravity** (without operator or ballast, with minimum recommended fuel and fluids and tires as used for operation). Horizontal distance from rear wheel axis 52 in (1.829 mm). Vertical distance above road level 78 in (1.981 mm). Horizontal distance from center of rear wheel road to 9 in (229 mm) to the right. **Hydraulic control system** direct engine drive. **Transmission** electric gear fixed ratio with full range operator controlled, 12 power shift. **Advertised speeds** mph (km/h) first 2.0 (3.2) second 2.5 (4.0) third 3.0 (4.8) fourth 3.7 (5.9) fifth 4.4 (7.1) sixth 5.5 (8.9) seventh 6.5 (10.5) eighth 7.8 (12.5) ninth 9.3 (15.0) tenth 11.2 (18.0) eleventh 13.2 (21.2) twelfth 15.9 (25.6). **Reverse** 2.7 (4.3) 4.8 (7.8). **Clutch** wet multiple disc hydraulically power actuated by foot pedal. **Brakes** caliper disc hydraulically operated by foot pedal. **Steering** hydrostatic and articulated. **Turning radius** (no reaction on face without brakes) right 240 in (6.096 m) left 240 in (6.096 m). **Turning space diameter** (no reaction on face without brakes) right 360 in (9.144 m) left 360 in (9.144 m). **Power take-off** 1001 rpm at 2100 engine rpm. **Unladen tractor mass** 21,980 lb (11,962 kg).

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 7th GEAR

Crankshaft Speed rpm	2099	1886	1692	1467	1253	1044
Pull—lbs (kN)	13107 (58.30)	14792 (65.80)	16361 (72.76)	17622 (78.39)	18272 (81.28)	17507 (77.88)
Increase in Pull %	0	13	25	34	39	34
Power—Hp (kW)	230.38 (171.83)	232.66 (173.49)	228.65 (170.50)	214.04 (159.63)	189.20 (141.09)	151.18 (112.73)
Speed—Mph (km/h)	6.59 (10.60)	5.90 (9.49)	5.24 (8.43)	4.55 (7.32)	3.88 (6.25)	3.24 (5.21)
Slip %	2.75	5.15	5.48	5.96	5.96	5.80

TRACTOR SOUND LEVEL WITH CAB

	dB(A)
Maximum Available Power—Two Hours	80.0
75% of Pull at Maximum Power—Ten Hours	79.0
50% of Pull at Maximum Power—Two Hours	79.0
50% of Pull at Reduced Engine Speed—Two Hours	77.5
Bystander in 12th gear	90.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., Size, ply & psi (kPa)	four 23.1-34, 8, inner 14 (95) outer 12 (83)	four 23.1-34, 8, inner 14 (95) outer 12 (83)
Ballast	—Tire equip. (each)	15 lb (7 kg)	None
	—Cast Iron (each)	None	None
Front Tires	—No., Size, ply & psi (kPa)	four 23.1-34, 8, inner 14 (95) outer 12 (83)	four 23.1-34, 8, inner 14 (95) outer 12 (83)
Ballast	—Liquid (each inner)	1580 lb (626 kg)	None
	—Cast Iron (each)	None	None
Height of Drawbar		19 in (483 mm)	19 in (483 mm)
Static Weight with Operator	—Rear	12980 lb (5888 kg)	12740 lb (5779 kg)
	—Front	18470 lb (8378 kg)	15710 lb (7126 kg)
	—Total	31270 lb (14184 kg)	28450 lb (12905 kg)

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	2500 (17240)		
Location	remote outlet		
Hydraulic oil temperature °F (°C)	135 (57)		
Location	charge pump inlet		
	Maximum Lift Capacity		**Lift Capacity for Transport**
QUICK ATTACH	yes		
CATEGORY	3		*not measured
LOAD lbs (kg)	12768	(5791)	
TIME sec	2.95		
HITCH POINT MOVEMENT in (mm)			
Lowest position	9.9	(252)	
Top of timed range	35.9	(912)	
Highest position	40.1	(1019)	
LOAD CG MOVEMENT in (mm)			
Lowest position	10.6	(269)	
Top of timed range	36.2	(919)	
Highest position	41.5	(1054)	

*Implement load capacity for transport purposes not specified by manufacturer.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 161°F (71.5°C). Eight gears were chosen between 15/3 mph and 10 mph (16.1 km/h). The performance figures on this report apply to Cougar 1000 models equipped with Caterpillar Diesel engines.

We, the undersigned, certify that this is an true and correct report of official Tractor Test No. **1593**, June 13, 1986.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers